

**REMARKS**

This Amendment is filed in response to the Office Action dated December 12, 2008. For the following reasons this application should be allowed and the case passed to issue. No new matter is introduced by this Amendment. New claims 26 and 27 are supported by the specification at paragraph [0041].

Claims 1, 4-9, 16-22, and 25-27 are pending in this application. Claims 1, 4-9, 16-22, and 25 have been rejected. Claims 2, 3, 10-15, 23, and 24 were previously canceled. Claims 26 and 27 are newly added.

***Claim Rejections Under 35 U.S.C. §§ 102/103***

Claims 1, 4-6, 9, 16-22, and 25 were rejected under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, as obvious over Delnick (US 5,948,464), as evidenced by Walls et al. (*Fumed Silica-Based Composite Polymer Electrolytes: Synthesis, Rheology, and Electrochemistry*). The Office Action averred that Delnick discloses a separator comprising a silica filler and a polymer binder. The separator comprises indefinite-shape particles comprising shapes of dendrites, grape clusters, or coral. The Office Action asserted that Walls et al. disclose that fumed silica consists of fused silica particles. The Office Action further noted that Koike discloses that the particle size of fine particles is preferably from 5 µm to 10 µm, thus the primary particle would not be more than 10 µm.

This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

Initially, it is noted that Koike is not cited in the statement of the rejection. It is believed that the Examiner intended to make the rejection over Delnick as evidenced by Walls **and** Koike. The Examiner is respectfully requested to clarify the grounds of this rejection.

Delnick, as evidenced by Walls and Koike, do not disclose or suggest the “neck is formed between at least a pair of said single crystalline particles, said neck comprising the same material as said single crystalline particles.” A dictionary definition of “neck” is attached to this response. A neck is defined as “. . . 5. any narrow, connecting, or projecting part suggesting the neck of an animal.” RANDOM HOUSE WEBSTER’S UNABRIDGED DICTIONARY, 2D ED., p. 1284. In view of the definition of “neck” it is clear that agglomeration of particles or crosslinking through carbon bonds on the surface of the particles would not form a neck, wherein the neck comprises the same material as the single crystal particles, as required by claim 1. In the case of agglomeration, no neck would be formed.

As regards independent claim 16, the fumed silica does not comprise a plurality of single crystalline particles that are diffusion bonded to each other and a neck formed between at least a pair of the single crystalline particles, the neck comprising the same material as the single crystalline particles, as required by claim 16. US Patent No. 6,084,767 to Day and US Patent No. 5,965,299 to Khan et al. provide support for Applicants’ position. Fumed silica is usually an agglomerate of spherical superfine particles produced when silane gas ( $\text{SiH}_4$ ) is oxidized or silicon in a gaseous state is oxidized in an arc flame. Day discloses (column 2, lines 42-45) that fumed silica is an agglomeration of small spheroids of about 12 to 13 nanometers in diameter. In other words, fumed silica is an agglomerate of spherical fine particles and has **no neck** formed between a pair of single crystal particles. Furthermore, it is evident in Khan et al. (Figs. 2 and 3) that fumed silica is not in the form of dendritic polycrystalline particles having a neck formed between a pair of single crystal particles. For example, in Fig. 3 of Khan et al., the particles are agglomerated through cross-linking of the functional groups (C=C) on the surface of the particles instead of necks. In the case of cross-linking, even if a neck is formed, and there is no indication

that a neck is formed, the neck would not be of the same material as the single crystalline particles. Furthermore, as explained on page 9 the response filed June 18, 2008, diffusion bonding has an art recognized definition:

Diffusion bonding of materials in the solid state is a process for making a monolithic joint through the formation of bonds at atomic level, as a result of closure of the mating surfaces due to the local plastic deformation at elevated temperature which aids interdiffusion at the surface layers of the materials being joined.

Clearly the cited prior art does not disclose or suggest “diffusion bonded,” as required by claim 16.

It is further submitted that even if fumed silica were to have a “neck” formed between a pair of single crystal particles, and Applicants maintain it does not, it would not have been obvious to select such fumed silica having a neck instead of normal silica having no neck.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the disclosure in a single reference of each element of a claimed invention. *Helifix Ltd. v. Blok-Lok Ltd.*, 208 F.3d 1339, 54 USPQ2d 1299 (Fed. Cir. 2000); *Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994); *Hoover Group, Inc. v. Custom Metalcraft, Inc.*, 66 F.3d 399, 36 USPQ2d 1101 (Fed. Cir. 1995); *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051 (Fed. Cir. 1987). Because Delnick does not disclose the particulate filler substantially comprising indefinite shape particles which have the shape of dendrites, grape clusters, or coral, the shape having a neck, as required by claim 1; and the indefinite-shape particles are polycrystalline particles comprising a plurality of single crystalline particles that are diffusion bonded to each other, and a neck is formed between at least a pair of the single crystalline

particles, the neck comprising the same material as the single crystalline particles as required by claim 16, Delnick does not anticipate claims 1 and 16.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily available to one of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). There is no suggestion in Delnick, Walls et al., and Koike to modify the Delnick batteries so that the particulate filler substantially comprises indefinite-shape particles which have the shape of dendrites, grape clusters, or coral, the shape having a neck, as required by claim 1; and the indefinite-shape particles are polycrystalline particles comprising a plurality of single crystalline particles that are diffusion bonded to each other, and a neck is formed between at least a pair of the single crystalline particles, the neck comprising the same material as the single crystalline particles, as required by claim 16.

The only teaching of the claimed secondary batteries is found in Applicants' disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claim 8 was rejected under 35 U.S.C. § 103(a) as obvious over Delnick. The Office Action considered it obvious that a lithium ion battery would comprise non-aqueous solvent and a lithium salt.

This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. Claim 8 is allowable for at least the same reasons as claim 1.

Claims 7 and 20 are rejected under 35 U.S.C. § 103(a) as obvious over Delnick in view of Waterhouse. The Office Action acknowledged that Delnick does not disclose the resin binder comprises a polyacrylic acid derivative. The Office Action relied on the Waterhouse teaching of acrylic acid as a binder in a separator to conclude that it would have been obvious to substitute acrylic acid as a binder into the separator of Delnick because the selection of a known material based on the suitability for its intended use is obvious.

This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. Claims 7 and 20 are allowable for at least the same reasons as claims 1 and 16, respectively, as Waterhouse does not cure the deficiencies of Delnick.

The dependent claims, including new claims 26 and 27, are allowable for at least the same reasons as the independent claims from which they depend, and further distinguish the claimed secondary batteries. For example, the cited references do not suggest the indefinite-shape particle comprises a plurality of primary particles bonded to each other, and the indefinite-shape particle has a mean particle size that is twice or more than the mean particle size of the primary particles and not more than 10  $\mu\text{m}$ , as required by claim 4. In addition, the cited references do not suggest that the metal oxide comprises alumina particles, as required by new claims 26 and 27.

In view of the above amendments and remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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